Endoscopic Endonasal Trans-Sphenoidal Approach
Personal Experience

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ABSTRACT

Background: Endoscopic trans-sphenoidal skull base surgery is the most recent development of endoscopic expanded approaches with widespread acceptance results from the direct extra cerebral access to the ventral skull base and the avoidance of brain manipulation and neurovascular dissection

Objective: To describe postoperative nasal complications of endoscopic endonasal trans-sphenoidal approach.

Methods: A cross-sectional descriptive study was conducted on 50 patients attended Medical city complex, Otorhinolaryngology and neurosurgery department from October 2018 to October 2019. They were followed until discharge from hospital then with average of three months follow up postoperatively.

Results: During this period complications occurred like epistaxis 4%, cerebrospinal fluid rhinorrhea 6%, olfactory disorders 56%, adhesions 28%, sinusitis 4%, atrophic rhinitis 2%, and no septal perforation discovered during the period of study.

Conclusions: Endoscopic endonasal trans-sphenoidal approach is safe and associated with low rate of nasal complications. Detailed knowledge of the variable anatomy, meticulous operating technique and post-operative care is crucial to optimize patient outcomes.

Keywords: Postoperative, Endonasal trans-sphenoidal complications, Skull base surgery.

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Endonasal surgery of the cranial base began with pituitary surgery and gradually progressed to encompass neighboring regions of the cranial base. It became apparent that the sphenoid sinus was the starting point for access to most of the cranial base and it contain the most critical anatomical structures, including the optic nerves and the internal carotid arteries (ICAs)[1].

The first step in avoiding complications is to perform only operations for which the surgeon is highly trained. A training program, is a useful instrument for assisting the surgeon in handling incremental and modular surgical difficulties[2].

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Complications are usually classified into: Immediate complications like cerebro-spinal fluid (CSF) leak, vascular and neurological complications, and delayed complications like CSF leak, vascular, olfactory disorders, nasal crustations, atrophic rhinitis and sinusitis and endocrine complications[2].

The purpose of this study is to analyze the postoperative nasal complications after endoscopic endonasal trans-sphenoidal approach.

Methods

The sample consisted of 50 patients (27 males and 23 females) who attended Medical City Complex, Otorhinolaryngology and Neurosurgery departments from October 2018 until October 2019. For every patient in the sample; proper history and examination done, CT scan of nose and para-nasal sinuses (PNS) axial, coronal and sagittal views had been done and MRI

of brain and skull base to evaluate the pathology and plan the surgery.

Inclusion criteria: The age range between 10-72 years. The sphenoid sinus (sellar and pre-sellar) types. Fit for general anesthesia. Pathology indicated for surgery: pituitary apoplexy, craniopharyngiomas, meningioma, non-functional pituitary macroadenoma with mass effect like visual symptoms, functional pituitary adenoma like prolactinoma not respond to medical treatment, acromegaly and Cushing disease.

Exclusion criteria: Large lesions with anterior suprasellar extension. Large lateral extension into the cavernous sinus. conchaI-type sphenoid sinuses. Large retroclival lesions.

All notes of the CT scans of the patients also were recorded in the notebook according to check list below:

- Septal deviation.
- State of the nasal turbinates.
- Sphenoid sinus pneumatization type (sellar, presellar).
- Signs of infection or pathology.
- Anatomical variations (Onodi cells).
- Sphenoid intersinus septation.

The operations were performed with Binostril Endoscopic Endonasal Trans-sphenoidal technique; postoperative the patients were taken to the recovery room for close observation until they were completely awake.

Results

Of the 50 patients studied, 40 (80%) of them had adenoma, 9 (18%) with craniopharyngioma, and only one with meningioma (2%), (Table 1).

Table 2 shows that 41 (82%) of the patients with sellar type and 9 (18%) with suprasellar.

According to the age range from 10 to 72 years with mean of (38.4 ±14.9) and most common age group was between 30-39 years, (Table 3).

After average of three months follow up, the most common complication was olfactory disorder, 56% in the first month which then decreased to 6% after follow up and treatment, (Table 4).

Because of the bilateral-nostril approach used in the current study, a window technically opened in the posterior septum; therefore, this was not considered a complication but a part of the surgical technique.

CSF leak, olfactory disorder and adhesions were more common in caniopharyngioma cases while other complications were less noticed, (Table 5).

Complications like CSF leak, olfactory disorder, adhesions are more likely to occur with suprasellar approach, (Table 6).

Table 1: Distribution according to pathology.

Pathology	Number	Percentage
Adenomas	40	80
Craniopharyngioma	9	18
Meningioma	1	2

Table 2: Types of approaches used.

Approach	Number	Percentage
Trans-sellar	41	82
Suprasellar	9	18
Total	50	100

Table 3: Age groups.

Age group	Number	Percentage
10-19	4	8
20-29	10	20
30-39	15	30
40-49	9	18
50-59	6	12
≥60	6	12
Total	50	100

Table 4: Distribution of complications according to time.

Complications	Duration			Total	Percentage
	1st month	2nd month	3rd month		
Epistaxis	2	0	0	2	4
CSF leak	3	0	0	3	6
Olfactory disorder	28	12	3	28	56
Adhesion	14	5	2	14	28
Sinusitis	0	2	1	2	4
Atrophic Rhinitis	1	1	1	1	2

Table 5: Distribution of complications according to the pathology.

Pathology	Epistaxis		CSF leak		Olfactory disorder		Adhesions		Sinusitis		Atrophic Rhinitis	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Adenoma	1	3.6	0	0.0	18	64.2	7	25.0	1	3.6	1	3.6
Craniopharyngioma	1	5.3	2	10.5	9	47.4	6	31.6	1	5.3	0	0.0
Meningioma	0	0.0	1	33.3	1	33.3	1	33.3	0	0.0	0	0.0
Total	2	4.0	3	6.0	28	56.0	14	28.0	2	4.0	1	2.0

Table 6: Distribution of complications according to the approach.

Complications	Approach			
	Transsellar		Suprasellar	
	No.	%	No.	%
Epistaxis	1	50.0	1	50.0
CSF leak	1	33.3	2	66.7
Olfactory disorders	20	71.4	8	28.6
Adhesions	8	57.1	6	42.9
Sinusitis	1	50.0	1	50.0
Atrophic Rhinitis	1	100.0	0	0.0
Total	32	64.0	18	36.0

Discussion

Endoscopic endonasal transsphenoidal approach to the skull base considered the route of choice for the treatment of various disorders, particularly pituitary adenomas. However, the need to manipulate the nasal cavity and the paranasal sinuses, may result in sinonasal complications.

Epistaxis in the current study occurred in 2 (4%) patients. This agrees with Cheng[3] (4.8%) and Pereira[4] (4.8%). While these results disagree with Gómez-Amador[5] where no patient got epistaxis and disagree also with Gondim[6] where only (0.8%) developed epistaxis. The bleeding from

sphenopalatine artery (SPA) treated with clipping and electrocoagulation.

Cerebrospinal fluid rhinorrhea in the current study occurred in 3 (6%) patients. This agree with Cheng[3](6.9%), Dolci[7] (7.3%) and disagree with Pereira[4] (14.4%) which show higher percentage of CSF rhinorrhea while Lasheen[8] had no patients developed such complication.

Most cases are caused by the opening of the suprasellar space so most leak happened in caniopharyngioma cases and when suprasellar approach used. Once an intraoperative cerebrospinal fluid leakage has been noticed, repair should be performed strictly during the operation with the appropriate method.

The complaint of olfactory disorder was very common the current study, 28(56%) patients. Mostly noticed in the first month and large percentage of patients improved with medications. Most of the cases were craniopharyngioma cases. As most craniopharyngioma were operated by suprasellar approach which leads to more damage to the olfactory area. It was often caused by injures to the nasal mucosa which contains the olfactory nerve endings. During the operation, surgeons should effectively protect the nasal mucosa, especially from injuries. It is safe to operate at the range of 10 mm from the cribriform plate beside the nasal septum and 15 mm from the cribriform plate beside the turbinate. After operation regular review of the nasal cavity and application of topical medication with regular nasal irrigation can promoting the recovery of olfactory function

This high percentage is agreeing with Zada[9] (27%), Dolci[7](39%) and disagrees with Cheng[3](1.6%), Lasheen[8] and Linsler[10] where no patients developed olfactory disorders.

Fourteen patients (28%) developed adhesions mostly occurred in the 1st month and well responded to endoscopy assisted releasing of the adhesion and topical medications. And this percentage agrees with Dolci [7] (19.5%) and Constantino[11] (21.4%) and disagrees with Cheng[3] (2.3%) and Lasheen[8] where no adhesions reported.

In the current study, sinusitis occurred in 2 (4%) patients and they were well treated with mediations. The main causes of postoperative sinusitis: ignoring medication during the perioperative period; injury to the nasal mucosa during operation and damage to the mucosa mucus-cilium system. The postoperative nasal packing should be performed gently; the middle turbinate should be fixed at the normal position, and the packing should be removed within 48 hours with regular post-operative topical medications and follow up. This agrees with Pinar[12] (3.1%), Cheng[3] (2.3%), Pereira[4] (1.9%) and disagrees with Lasheen[8] where no cases of sinusitis were reported.

No septal perforation occurred in the current study. This agrees with Lasheen[8] Dolci[7] and Zada[9] where also no cases were reported.

Low rate of atrophic rhinitis in the current study occurred with one (2%) patient after three months of follow up. And this agrees with Cheng[3] (1.6%). The three main causes of postoperative atrophic if the disease was induced intraoperatively, by damage to the nasal mucosa, intraoperative and postoperative nasal hemorrhage leading to cauterization of nasal mucosa and use of tight postoperative nasal packing and kept for long duration. So we suggest effective protection of nasal mucosa, and accurate packing of the nasal cavity.

In conclusion; Excellent pre-operative preparation and optimum treatment of post-operative nasal complications can improve nasal function and decrease clinical symptoms so improve patient's quality of life. We consider trans-sphenoidal approach to be safe and efficient approach when surgical team are familial with anatomical variations and have good experience in endoscopy of skull base and reconstruction techniques, and appropriate instruments are available.

Recommendations: Regular nasal endoscopic examination post operatively

and early treatment of nasal complications effectively decrease nasal complications and improve outcomes. More data needed in future studies with longer duration of follow up.

References

1. Snyderman CH, Gardner PA, Fernandez-Miranda JC, Wang EW. Extended anterior skull base approaches. In: Scott - Brown's Otorhinolaryngology Head and Neck Surgery. CRC Press; 2018. p. 1289–303.
2. Kennedy DW, Hwang PH. Rhinology: diseases of the nose, sinuses, and skull base. J Laryngol Otol 2012;126:1194.
3. Cheng Y, Xue F, Wang T-Y, Ji J-F, Chen W, Wang Z-Y, et al. Analyses and treatments of postoperative nasal complications after endonasal transsphenoidal resection of pituitary neoplasms. Medicine (Baltimore) 2017; 96(15).
4. Pereira EAC, Plaha P, Chari A, Paranathala M, Haslam N, Rogers A, et al. Transsphenoidal pituitary surgery in the elderly is safe and effective. Br J Neurosurg 2014;28(5):616–21.
5. Gómez-Amador JL, Martínez-Anda JJ, Morales-Martínez AH, Juan CD, Martínez-Manrique JJ. Management of complications in endoscopic endonasal surgery for pituitary adenomas. J Neurol Disord 2015; (open access).
6. Gondim JA, Almeida JP, de Albuquerque LAF, Gomes E, Schops M, Mota JI. Endoscopic endonasal transsphenoidal surgery in elderly patients with pituitary adenomas. J Neurosurg 2015;123(1):31–8.
7. Dolci RLL, Miyake MM, Tateno DA, Cançado NA, Campos CAC, Santos ARL dos, et al. Postoperative otorhinolaryngologic complications in transnasal endoscopic surgery to access the skull base. Braz J Otorhinolaryngol 2017;83:349-55.
8. Lasheen H, Youssef O. Chronic nasal complication following endoscopic and microscopic direct transnasal transsphenoidal pituitary adenoma surgery. Egypt J Otolaryngol 2017;33(1):20-3.
9. Zada G, Kelly DF, Cohan P, Wang C, Swerdloff R. Endonasal transsphenoidal approach to treat pituitary adenomas and other sellar lesions: an assessment of efficacy, safety, and patient impressions of the surgery. J Neurosurg 2003;98(2):350-8.
10. Linsler S, Gaab MR, Oertel J. Endoscopic endonasal transsphenoidal approach to sellar lesions: a detailed account of our mononostril technique. J Neurol Surg Part B Skull Base 2013;74(03):146-54.
11. Constantino ER, Leal R, Ferreira CC, Acioly MA, Landeiro JA. Surgical outcomes of the endoscopic endonasal transsphenoidal approach for large and giant pituitary adenomas: institutional experience with special attention to approach-related complications. Arq Neuropsiquiatr 2016;74:388-95.
12. Pinar E, Yuceer N, Imre A, Guvenc G, Gundogan O. Endoscopic endonasal transsphenoidal surgery for pituitary adenomas. J Craniofac Surg 2015; 26(1):201-5.

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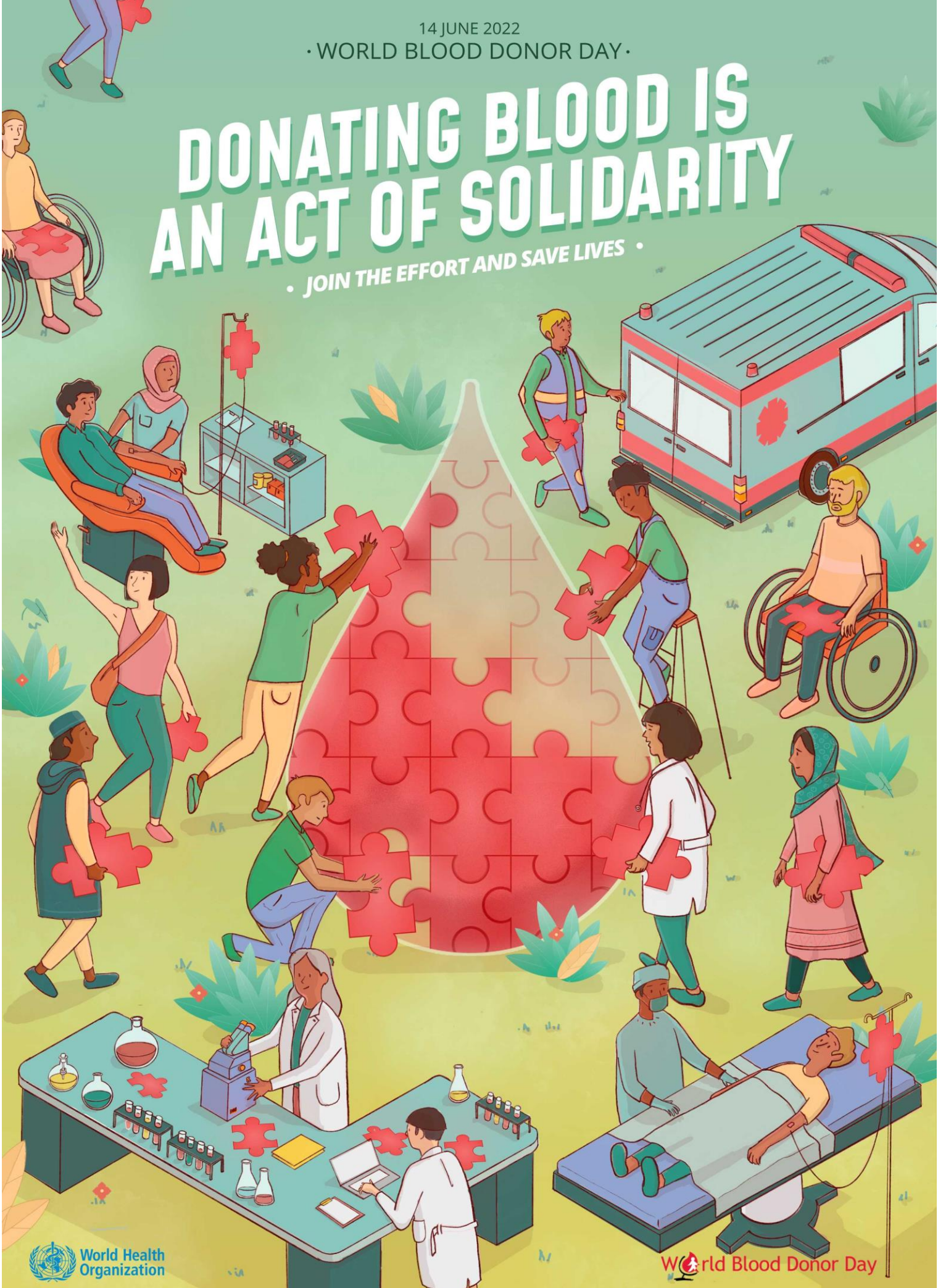

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